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Enhancing Academic Achievement and Transition Outcomes Using Technology

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The Problem

How can educators align transition goals with standards-based education? Addressing the individual needs of students with disabilities and successfully meeting academic standards for all students is challenging. Therefore, it is critical that innovative curricula emerge that combine standards-based academics with transition planning to facilitate access to general education, including multiple-outcome measures and learning supports (Kochhar-Bryant & Bassett, 2002).

In response to this challenge, the Nisonger Center at Ohio State University (OSU) developed a standards-driven, computer-based curriculum for students with disabilities in grades 8 through 10. Its curriculum emphasizes three essential skills: (a) reading competencies needed to pass state-mandated assessments; (b) information literacy skills needed to conduct research using the Internet; and (c) career planning needed to gain successful postschool transition outcomes. This computer-based instruction (CBI) uses career development—a personally meaningful context—to teach academic standards and to enhance student engagement, while providing the fundamental transition planning needed for success. This brief will (a) demonstrate the process that educators can use to align standards-based education with transition, using OSU's CBI as an example; and (b) provide research-based evidence for student advancement when standards-based learning is delivered in a personally relevant context.

Bridging the Outcome Gap: The Intersection of Standards, Careers, and Technology

The following practices, based on research by the authors, are recommended to help students with disabilities meet academic standards and attain the skills needed for positive in-school and postschool outcomes.

1. Integrate technology into the classroom to increase standards-based achievement and developing marketable skills.

Recent data from the National Longitudinal Transition Study-2 indicates that computers are underutilized in secondary general-education classrooms, although they have been proven to enhance achievement (Dalton, Pisha, Eagleton, Coyne, & Deysher, 2001; Dalton & Pisha, 2001).

The NLTS2 reported that 75% of students with disabilities in general education settings rarely or never use computers for academic drill and skill practice; 47% rarely or never use computers for word processing; and 42% rarely or never use the Internet (Newman, 2004). Therefore, three technology-based strategies are recommended for educators to teach the information literacy skills that students need to be competitive in the global economy:

1. Incorporate information literacy instruction into assignments and class projects;
2. Use CBI as a unit or sequence of curricular units in place of traditional instruction; and
3. Provide access to, and encourage usage of, assistive technology (AT) to students with and without disabilities.

The key to using these strategies is to view technology as a means to an end, rather than an addition that requires considerable effort and planning on top of an already tight schedule and workload. Such strategies can result in meeting core reading, writing, and research standards. Standards adopted by the Ohio Department of Education for grades 8 to 10 that correlate to national standards are:

- ***Acquisition of Vocabulary***—Use context clues and text structures to determine the meaning of new vocabulary.
- ***Reading Process: Concepts of Print, Comprehension, and Self-Monitoring Strategies***—Demonstrate concepts of print and electronic text by responding to questions, differentiating between fact and opinion, drawing inferences, making predictions, locating a stated or implied idea, and differentiating between details.
- ***Research***—Evaluate the usefulness and credibility of data and sources through examination of resource material for a specified audience or purpose.

Like other states responding to the need for an increasingly technical labor force, the Ohio Department of Education has recently adopted academic technology standards as a requirement rather than an option. These standards encompass:

- ***Computer and Multimedia Literacy***—Appropriate use of hardware, software applications, multimedia tools, and other electronic technology for productivity and communication. Necessary for advanced study in computer science.
- ***Information Literacy***—Acquisition, interpretation, and dissemination of information, focusing on effective methods for locating, evaluating, using, and generating information. Includes using the Internet and other electronic information resources for research and knowledge building.
- ***Technological Literacy***—Skills needed to participate in a technological world. Includes the intersection of mathematics, science, and technology, and encompasses unique knowledge, devices, and capabilities used to solve problems. Identifies career connections between technology and the world of work. Includes technology education and pre-engineering concepts needed for advanced study.

To demonstrate the difference that infusing technology into the classroom can make, a 25-item online information literacy test (O'Hanlon, 2002) was administered to ninth- and tenth-graders in three regional Ohio high schools. This was a pretest-posttest measure of knowledge obtained in OSU's pilot CBI program during the 2002-03 and 2003-04 school years. In both years, students with disabilities comprised more than 30% of students in the inclusive classrooms that served as the pilot sites. Students with and without disabilities ($N = 176$) significantly improved ($t = 6.4$, $p <. 001$ [two-tailed], $d = 1.1$) with an average 15.8% increase in test scores. Students were more able to efficiently retrieve, process, and evaluate Web-based information—skills that represent the critical reading, research, and technology standards listed above.

Teaching computer, information, and technological literacy skills in the classroom might be perceived as an addition to the curricula, but it is an efficient method of meeting academic standards while simultaneously helping students prepare for a contemporary workplace. Students with disabilities will be at even greater disadvantage if such technical skills are not developed and cultivated (Luecking, Fabian, & Tilson, 2004). Use of information literacy, CBI, and assistive technology can help all students learn, but for students with disabilities, these skills can serve as learning supports that can bolster overall performance and promote a fair and positive learning environment.

2. Integrate learning supports into computer-based and traditional instruction to enhance outcomes.

Integrating technology into the classroom provides numerous opportunities to offer learning supports within the curricula. Instead of giving students with disabilities a simpler version of the material at a lower reading level (Stahl, 2004), supports can be directly built into the CBI program and general instruction. These supports allow *equivalent information access* for students with disabilities to the content contained within the CBI and/or lectures. For example:

- Ensure that assistive technology is not only available but also encouraged and utilized. Anecdotal evidence from classroom observations in OSU's pilot CBI program showed that some schools purchased useful assistive technology programs that could help students with reading and understanding digital content, but the technology was placed in inaccessible locations (e.g., in a teacher's office or on one computer in a resource room) so that it was rarely used. Assistive technology's true power is its ability to facilitate standards-based learning through oral, auditory, and visual comprehension, as applicable. For instance, students who use screen-reader programs to read and write can read back what they have written to verify that their work conveys the intended meaning. This act of self-monitoring and checking for comprehension exemplifies the reading process standard defined earlier.
- Inform students of online resources such as databases, dictionaries, and thesauruses to enhance learning, meet academic standards, and expand transferable information literacy skills. For example, the *OneLook Dictionary* Web site used in OSU's pilot CBI program (*http://www.onelook.com*) provides an easy way to look up words students do not know as they complete assignments. Additionally, if a student uses a screen-reader program, the computer will read words back to them, facilitating vocabulary comprehension and thus meeting that academic standard.
- Develop *guided notes* for lectures and Web-based content so students have the structure and support to find critical information. A *universal design for learning* (UDL) strategy, guided notes are teacher-prepared outlines of the content that give students background information but require students to fill in key ideas or concepts. Thus,

students must actively access the CBI or lecture for key information, which increases their retention of course content (Heward, 2002).

3. Integrate critical-thinking, career decision-making, and transition planning skills into a technologically enhanced general curricula.

As more students with disabilities are integrated into general class settings (Newman, 2004), it is essential to enhance the general education content with relevant critical-thinking, career decision-making, and transition-planning skills that students need. Learning to navigate the Internet using advanced search strategies and specialized databases enhances both reading and technology academic standards. Moreover, analyzing search results and determining how to narrow or broaden a search requires students to apply critical-thinking skills.

Additionally, conducting online research on the career development process makes learning directly relevant to students' lives. In OSU's 25-hour CBI program, students develop a step-wise, four-year high school plan to attain their career goals as part of a personalized career portfolio using PowerPoint software and digital media to summarize research found from online sources. Creating a career portfolio is a significant, lasting outcome of the CBI and requires application and synthesis of information rather than simple memorization, thus meeting several academic standards that focus on higher order processing while engaging students in their own self-discovery. Initial noteworthy tasks in creating the career portfolio include taking personality and career assessments, identifying educational and training requirements for two possible careers, comparing and contrasting the careers in a written narrative, selecting a career to research in-depth via search engines and databases, and evaluating the credibility of online information about the careers. Furthermore, for each unit, students take quizzes and engage in reading comprehension exercises modeled after the SAT and state-mandated assessments. These activities meet academic standards and assess understanding of information literacy and career concepts.

For students to invest their energy into learning to read and evaluate complex Web sites, conduct research using the Internet, and develop a reliable and valid transition plan, students must understand the interconnectedness and importance of these activities. As previously reported, student scores on an information literacy test significantly improved from pretest to posttest, and career development results follow that trend. Table 1 summarizes the results of a career pretest-posttest survey that was administered in three classrooms to freshmen and sophomores enrolled in participating English or technology classes during OSU's pilot CBI program. As Table 1 indicates, the number of students whose plans after high school were undecided decreased from 16.7% to 5.3% for students with disabilities and from 20.4% to 12.8% for students without disabilities. The number of students with disabilities who reported needing help finding a job after high school from pretest to posttest was almost reduced by half to a percentage comparable to students without disabilities. Finally, students' plans to attend a four-year college after high school increased for both populations.

Brad's Case

The process of building in (rather than adding on) relevant content and learning supports is an efficient approach to maximizing student outcomes in and out of the classroom. Evidence obtained from a single case study during OSU's pilot CBI program reveals the importance and

Table 1. **Pretest-Posttest Results of Computer-Based Instruction on Students' Transition Plans**

Results from Student Survey, Year 1	Pretest (%)	Posttest (%)
Students with Disabilities	(N = 24)	(N = 19)
Plans after high school: four-year college	33.3	47.4
Plans after high school: undecided	16.7	5.3
Needs assistance with finding a job after high school	62.5	36.8
Students without Disabilities	(N = 49)	(N = 47)
Plans after high school: four-year college	46.9	51.1
Plans after high school: undecided	20.4	12.8
Needs assistance with finding a job after high school	36.7	31.9

interrelationship of learning supports, career development, and improved outcomes. Brad, a student with a learning disability, had a predetermined career goal of helping his dad with the family landscaping business, a goal that did not require use of a computer. In fact, Brad was reluctant to use computers because he felt that reading on the computer would be too difficult for him. Once the OSU staff showed Brad the personality assessments and the career interest surveys that he could take online, his top career choice became working with cars. The OSU staff also designed some guided notes for the computer content that helped Brad keep track of his place in the curriculum. Brad stated that he liked the Web sites that helped him find out about the training requirements for becoming an auto technician. He learned that he could receive certification through the high school auto-technician program and enroll in a certificate program at the local community college.

In the end, formal classroom observation during a six-month period revealed that:

- Brad’s on-task behavior increased;
- His grade in English improved significantly;
- He identified a clear career goal based on his interests;
- He developed a specific career plan to accomplish this goal; and
- He acquired a greater level of technological competency needed for his career goal.

Conclusion

The challenge is for special educators to meet the competing demands of both NCLB and IDEA. This brief describes an innovative approach to aligning standards-based education with transition planning. The technological and career components of a specific CBI program can be adapted to the larger curriculum development process. Educators can meet academic standards by infusing technology, learning supports, information literacy, and transition skills into their curricula—skills ultimately needed for academic and life success in an increasingly technical world. It is possible to successfully meet the requirements of both NCLB and IDEA without compromising school accountability or the individual needs of a student with a disability.

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